OPTIMIZATION OF FLOW SHOP SCHEDULING THROUGH A HYBRID GENETIC ALGORITHM FOR MANUFACTURING COMPANIES

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Abstract.

A task scheduling problem is a process of assigning tasks to a limited set of resources available in a time interval, where certain criteria are optimized. In this way, the sequencing of tasks is directly associated with the executability and optimality of a preset plan and can be found in a wide range of applications, such as: programming flight dispatch at airports, programming production lines in a factory, programming of surgeries in a hospital, repair of equipment or machinery in a workshop, among others. The objective of this study is to analyze the effect of the inclusion of several restrictions that negatively influence the production programming in a real manufacturing environment. For this purpose, an efficient Genetic Algorithm combined with a Local Search of Variable Neighborhood for problems of n tasks and m machines is introduced, minimizing the time of total completion of the tasks. The computational experiments carried out on a set of problem instances with different sizes of complexity show that the proposed hybrid metaheuristics achieves high quality solutions compared to the reported optimal cases.

Keywords

Hybrid genetic algorithm, Scheduling, Flow shop, Variable neighborhood search